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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/721,488	11/25/2003	Shiping Guo	EMCORE 3.0-081	6052
530	7590	02/13/2006	EXAMINER	
LERNER, DAVID, LITTENBERG, KRUMHOLZ & MENTLIK 600 SOUTH AVENUE WEST WESTFIELD, NJ 07090			TRAN, MINH LOAN	
			ART UNIT	PAPER NUMBER
			2826	

DATE MAILED: 02/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/721,488

Applicant(s)

GUO ET AL.

Examiner

Minh-Loan T. Tran

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 November 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) 10-18 and 25-33 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-9 is/are allowed.
- 6) ☒ Claim(s) 19-21 is/are rejected.
- 7) ☒ Claim(s) 22-24 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 20 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 20, lines 3 and 4, "said first superlattice consist essentially of semiconductors according to the formula $\text{Al}_r\text{Ga}_{(1-r)}\text{N}$, where $0 \leq r \leq 1$ " is inconsistent with claim 19 because claim 19 recites $0 < r < 1$.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weeks, Jr. et al. (6,617,060).

Figures 3A, 3B, 6-8 of Weeks, Jr. et al. disclose a semiconductor structure comprising a silicon substrate 14; an AlN nucleation layer 28 (fig. 6) overlying a surface of the silicon substrate 14; a buffer structure 12 including a superlattice structure directly overlying the AlN nucleation layer 28, the superlattice including a plurality of nitride-based semiconductors of different compositions, wherein each of the plurality of nitride-based semiconductors having its respective composition according to the formula $\text{Al}_x\text{Ga}_{(1-x)}\text{N}$, where $0 < x < 1$ and In concentration is equal to 0 (see lines 41-65 in column 5, claims 14 and 15 of Weeks, Jr. et al.), an operative structure of one or more GaN-based semiconductors (16-36) overlying the buffer structure 12 (fig. 7, 8).

Weeks, Jr. et al. does not disclose the nucleation layer 28 having a polycrystalline structure. However, it would have been obvious to one of ordinary skill in the art to form the AlN nucleation layer 28 of Weeks, Jr. et al. having polycrystalline structure because such crystalline structure of AlN is conventional in the art for forming the buffer layer for reducing the lattice mismatch between the silicon substrate and the GaN-based semiconductor structure overlying the silicon substrate.

Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Weeks, Jr. et al. (6,617,060) in view of Feltin et al. (Stress control in GaN grown on silicon (111) by metalorganic vapor phase epitaxy, Applied Physics Letters, Vol. 79, No. 20, Nov. 2001.)

Figures 3A, 3B, 6-8 of Weeks, Jr. et al. disclose all the subject matter claimed except for the second superlattice including a plurality of nitride-based semiconductors

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overlying an intermediate layer. However, figure 1 of Feltin et al. discloses a first superlattice including a plurality of nitride-based semiconductors, a GaN intermediate layer overlying the first superlattice and a second superlattice including plurality of nitride-based semiconductors overlying the GaN intermediate layer.

Therefore, it would have been obvious to one of ordinary skill in the art to form the buffer structure of Weeks, Jr. et al. having a second superlattice including a plurality of nitride-based semiconductors overlying an intermediate layer such as taught by Feltin et al. in order to decrease the stress, thus preventing crack formation in an overgrown GaN-based semiconductors.

Allowable Subject Matter

4. Claims 1-9 are allowed.

Claims 1-9 are allowed over the prior art of record because none of these references disclose or can be combined to yield the claimed invention such as a layer of aluminum directly formed on the surface of the silicon substrate and the polycrystalline nucleation layer of nitride semiconductor directly overlying the aluminum layer as recited in claim 1.

5. Claims 22-24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

6. Applicant's arguments with respect to claims 1-9 and 19-24 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

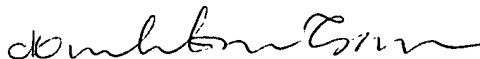
8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Minh-Loan T. Tran whose telephone number is (571) 272-1922. The examiner can normally be reached on Monday-Friday 9:00 AM-5:30 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J. Flynn can be reached on (571) 272-1915. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mlt
02/2006


Minh-Loan T. Tran
Primary Examiner
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